

move from the point B, continually till it come to L, the Arch QF will first increase and then decrease, and so will the Angle AXR which the rays AN and GR contain; and the Arch QF and Angle AXR will be biggest when ND is to CN as $\sqrt{11-RR}$ to $\sqrt{3} RR$, in which case NE will be to ND as 2 R to I. Also the Angle AYS which the rays AN and HS contain will first decrease, and then increase and grow least when ND is to CN as $\sqrt{11-RR}$ to $\sqrt{8} RR$, in which case NE will be to ND as 3 R to I. And so the Angle which the next emergent ray (that is, the emergent ray after three reflexions) contains with the incident ray AN will come to its limit when ND is to CN as $\sqrt{11-RR}$ to $\sqrt{15} RR$, in which case NE will be to ND as 4 R to I, and the Angle which the ray next after that emergent, that is, the ray emergent after four reflexions, contains with the incident will come to its limit, when ND is to CN as $\sqrt{11-RR}$ to $\sqrt{24} RR$, in which case NE will be to ND as 5 R to I; and so on infinitely, the numbers 3, 8, 15, 24, &c. being gathered by continual addition of the terms of the arithmetical progression 3, 5, 7, 9, &c. The truth of all this Mathematicians will easily examine.

Now it is to be observed, that as when the Sun comes to his Tropicks, days increase and decrease but a very little for a great while together; so when by increasing the distance CD, these Angles come to their limits, they vary their quantity but very little for some time together, and therefore a far greater number of the rays which fall upon all the points N in the Quadrant BL, shall emerge in the limits of these Angles, then in any other inclinations. And further it is

to be observed, that the rays which differ in refrangibility will have different limits of their Angles of emergence, and by consequence according to their different degrees of refrangibility emerge most copiously in different Angles, and being separated from one another appear each in their proper Colours. And what those Angles are may be easily gathered from the foregoing Theorem by computation.

For in the least refrangible rays the sines I and R (as was found above) are 108 and 81, and thence by computation the greatest Angle AXR will be found 42 degrees and 2 minutes, and the least Angle AYS, 50 degr. and 57 minutes. And in the most refrangible rays the sines I and R are 109 and 81, and thence by computation the greatest Angle AXR will be found 40 degrees and 17 minutes, and the least Angle AYS 54 degrees and 7 minutes.

Suppose now that O is the Spectator's Eye, and OP a line drawn parallel to the Sun's rays, and let POE, POF, POG, POH, be Angles of 40 degr. 17 min. 42 degr. 2 min. 50 degr. 57 min. and 54 degr. 7 min. respectively, and these Angles turned about their common side OP, shall with their other sides OE, OF; OG, OH describe the verges of two Rain-bows AFBE and CHDG. For if E, F, G, H, be Drops placed any where in the conical superficies described by OE, OF, OG, OH, and be illuminated by the Sun's rays SE, SF, SG, SH; the Angle SEO being equal to the Angle POE or 40 degr. 17 min. shall be the greatest Angle in which the most refrangible rays can after one reflexion be refracted to the Eye, and therefore all the Drops in the line OE shall send the most refrangible

R

rays